

Claims

[c1] I CLAIM:

1. A brake actuating assembly for a wheeled vehicle, comprising:
a hydraulically actuatable brake piston for moving friction braking surfaces into a braking condition to arrest wheel rotation;
an axially reciprocal cam member having a first cam surface for selectively moving the brake piston into the braking condition, and a second cam surface;
a first hydraulic circuit for supplying hydraulic fluid to axially translate said cam member from a brake released condition to a condition moving the brake piston into the braking condition;
a second hydraulic circuit for supplying hydraulic fluid to axially translate said cam member from a condition moving the brake piston into the braking condition to a brake released condition; and
a resilient assembly for selectively engaging the second cam surface to move said cam member obliquely to the direction of axial reciprocation wherein oblique cam member motion effective at first extreme establishes a braking condition and at opposite second extreme to es-

establish the brake released condition.

- [c2] 2. The brake actuating assembly of claim 1, wherein the first hydraulic circuit includes means for moving the hydraulically actuable brake piston toward the braking condition while translating the cam member.
- [c3] 3. The brake actuating assembly of claim 2, wherein the first hydraulic circuit further includes means for overpowering the resilient assembly while translating the cam member.
- [c4] The brake actuating assembly of claim 1, wherein the second hydraulic circuit includes means for moving the hydraulically actuable brake piston toward the braking condition while translating the cam member.
- [c5] 5. The brake actuating assembly of claim 1, wherein the first and second hydraulic circuits each include a hydraulic piston that engage a corresponding end of said cam member and respond to applied hydraulic pressure to translate said cam member.
- [c6] 6. The vehicle parking brake actuating assembly of claim 5, wherein the first and second hydraulic circuits each further include a displacement piston resiliently biased to displace fluid away from a corresponding hydraulic piston subsequent to enablement of the corresponding

hydraulic circuit.

- [c7] 7. The brake actuating assembly of claim 1, wherein the first hydraulic circuit includes a source of pressure fluid, a hydraulic piston engaging the cam member, and an electrically actuable valve for selectively supplying pressure fluid from the source to the resilient assembly to move the resilient assembly away from the cam member, and for selectively supplying pressure fluid from the source to the hydraulic piston forcing the hydraulic piston to translate the cam member.
- [c8] 8. The brake actuating assembly of claim 1, wherein the second hydraulic circuit includes a source of pressure fluid, a hydraulic piston engaging the cam member, and an electrically actuable valve for selectively supplying pressure fluid from the source to selectively supply pressure fluid from the source to the hydraulic piston forcing the hydraulic piston to translate the cam member.
- [c9] 9. The brake actuating assembly of claim 1, wherein the resilient assembly comprises a Belleville piston for engaging the cam member, and a Belleville spring mechanism for moving the Belleville piston toward the cam member.
- [c10] 10. The brake actuating assembly of claim 1, wherein

said cam member includes a positive release indent and a positive apply indent to receive said Belleville piston to prevent unintended parking actuation and parking release.

[c11] 11. A vehicle parking brake actuating assembly comprising:

a first hydraulic circuit selectively enabled to initially apply the vehicle parking brake;

a resilient bias assembly for retaining the vehicle parking brake in the applied state; and

a second hydraulic circuit selectively enabled to return the vehicle parking brake to an unapplied state.

[c12] 12. The vehicle parking brake actuating assembly of claim 11, wherein said resilient bias assembly includes a brake piston for actuating the brake, a Belleville piston, a Belleville spring engaging the Belleville piston to move the Belleville piston toward the brake piston, a cam member disposed intermediate the Belleville piston and brake piston, and means including the first and second hydraulic circuits for reciprocal shuttling of the cam member between a brake applied position where the cam member transfers a biasing force from the Belleville spring the brake piston, and a brake unapplied position where application of Belleville spring force to the brake piston is precluded by the cam member.

- [c13] 13. The vehicle parking brake actuating assembly of claim 12, wherein the first and second hydraulic circuits each include a hydraulic piston engaging a corresponding end of the cam member and responsive to applied hydraulic pressure to translate the cam member.
- [c14] 14. The vehicle parking brake actuating assembly of claim 13, wherein the first and second hydraulic circuits each further include a displacement piston resiliently biased to displace fluid away from the corresponding hydraulic piston subsequent to enablement of the corresponding hydraulic circuit.
- [c15] 15. A method of applying and releasing a wheeled vehicle parking brake, comprising:
hydraulically forcing a vehicle service brake into a vehicle wheel rotation braking condition;
applying a supplemental resilient bias to retain the vehicle service brake in the wheel rotation braking condition;
removing the hydraulic force while retaining the supplemental resilient bias thereby establishing and sustaining a parking brake condition in the service brake.
- [c16] 16. The method of applying and releasing a wheeled vehicle parking brake of claim 15, including the additional steps of:

re-establishing the hydraulic force to hydraulically move the vehicle service brake toward the vehicle wheel rotation braking condition;

removing the supplemental resilient bias; and

relieving the hydraulic force thereby establishing a parking brake released condition in the service brake.

[c17] 17. The method of applying and releasing a wheeled vehicle parking brake of claim 16, wherein the steps of applying and removing the supplemental resilient bias include reciprocal translating a cam back and forth along a path generally oblique to the direction in which the resilient bias is applied.

[c18] 18. The method of applying and releasing a wheeled vehicle parking brake of claim 17, wherein the steps of applying and removing the supplemental resilient bias further include a step of displacing the cam in the direction in which the resilient bias is applied.

[c19] 19. The method of applying and releasing a wheeled vehicle parking brake of claim 16, wherein the steps of applying and removing the supplemental resilient bias include varying the effective length of a mechanical coupling between a spring and a vehicle service brake applying piston.

- [c20] 20. The method of applying and releasing a wheeled vehicle parking brake of claim 16, wherein the step of applying the supplemental resilient bias includes initially temporarily applying hydraulic pressure to overpower the resilient bias.
- [c21] 21. The method of applying and releasing a wheeled vehicle parking brake of claim 20, wherein the step of applying the supplemental resilient bias further includes subsequently relieving hydraulic pressure allows the resilient bias to maintain the vehicle service brake in the wheel rotation braking condition.
- [c22] 22. The method of applying and releasing a wheeled vehicle parking brake of claim 21 wherein the step of applying the supplemental resilient bias further includes subsequently relieving hydraulic pressure allows the resilient bias to maintain the wheel service brake in a released condition.